CHAPTER 5 PLAN REQUIREMENTS

A. PLAN SUBMITTAL REQUIREMENTS

This list should be considered as a guideline for technical and engineering requirements and should not be considered as a comprehensive list for all the requirements of a submittal.

1. Construction Plan Submittal Requirements:

Design according to the “Public Infrastructure Plan Review Checklist” as provided by the Director of Engineering and/or the City of Kannapolis website. Ensure the following are included:

a. A north arrow.

b. Scale between 1”=10’ to 1”=40’, preferably 1”=20’ horizontal, & appropriate vertical scale.

c. Location of the property, including street name and address.

d. The character of the present and future property uses and the current zoning.

e. Location of existing property lines, rights-of-way, easements, turn lanes, tapers, utilities, retaining walls, storm drainage facilities, utility poles and guy wires, and other physical features which affect the driveway location.

f. Location of all proposed property lines, rights-of-way, easements, buildings, driveways, sidewalks, off-street loading facilities, interior parking arrangements, traffic circulation patterns, & number of spacing required, median openings with storage lanes and tapers.

2. Roadways:

a. Per City of Kannapolis Land Development Standards Manual, NCDOT and UDO Standards.

b. Include the “Site Plan Sheet Notes” as shown on the City of Kannapolis website.

c. Minimum road grade to be 1%, maximum is 10%.

d. Existing curb and gutter and pavement to be replaced or repaired as required to tie to sound material.

e. Tack coat to be applied to all existing asphalt surfaces prior to placing new asphalt.

f. Show locations of curb cut for curb ramps and provide curb ramp detail.

g. Provide a driveway plan sheet showing each lot and designating driveway locations and service locations.

h. Provide driveway details and driveway profiles.

3. Water & Sewer:

All Water and Sewer Extensions to the City of Kannapolis systems shall be permitted through the North Carolina Department of Environmental Quality (NCDEQ) and shall be in accordance with The Standard Specifications for Wastewater Collection and Water Distribution for the Water and Sewer Authority of Cabarrus County (WSACC) and The City of Kannapolis Water & Sewer Standards and Policies.

a. NCDEQ & City forms to be completed after initial City Review.

b. Permitted through NCDEQ (City to review prior to NCDEQ Submittal).

c. An electronic CAD file copy of the drawings is required for WSACC flow acceptance and verification of the water model.

d. Water Meters, Fire Hydrants, and Backflow devices per City Standards. Details in CAD and PDF files are provided on the City of Kannapolis website.

e. Include, the “Utility Plan Sheet Notes” as shown in this chapter and under the Water and Sewer Standards on the City of Kannapolis website.

f. All Fire Hydrants shall be connected to public mains owned and operated by the City of Kannapolis.

g. All Irrigation Lines shall be metered separately.

4. Stormwater Systems:

a. Per City of Kannapolis and NCDOT Standards. See chapter 3.B.3 for storm drain design criteria.

b. Public maintained structures shall be traffic rated.

c. All culverts shall be RCP (minimum class III and use class rated for cover/loads) unless approved by the Director of Engineering.

d. Provide details for all types of catch basins to be used. Ensure that culverts will fit in the proposed catch basin.

e. If an alternate drainage box design is requested, structural calculations and construction details must be provided to review the request.

f. Provide piping system profiles which include Hydraulic Grade Line (HGL).

g. O-ring culverts are required for pressurized systems.

h. Show that water is not being backed up on upstream properties or diverted onto lower properties.

5. Stormwater Calculations:

Provide a report documenting Pre & Post development conditions, offsite impacts, and the method of treatment. Ensure that the following items are included:

a. Pre & Post development drainage basin maps & hydrographs.

b. Rainfall runoff intensities and depths for Cabarrus County.

c. Documentation for curve number, C values, time of concentration, and the equations used to generate the stage/storage/discharge tables.

d. Buoyancy calculations for the riser and uplift anchor.

e. Inlet capacity analysis.

f. Stormwater conveyance (pipes, ditches, channels).

g. Detention provided for the 1-yr and 10-yr storm events.

h. Stormwater SCM Supplements.

6. Stormwater Structures:

a. Provide a cross-section of the embankment showing fill slope angles, top width, barrel size & type, riser size & type, orifices (including size, location, type, & inverts), top of dam elevation, and spillway elevation.

b. Make sure that the structures, orifices, and pipes and the associated inverts match in the design calculations and dimension details.

c. Provide a construction detail for the trash rack.

d. Show how the joints and connections will be made watertight.

e. Show uplift anchor dimensions.

f. Provide access and maintenance easements and provide a copy of the proposed maintenance agreement.

g. It is recommended that storage areas be fenced to prevent inadvertent entry.

h. Provide a minimum 6” of freeboard in the system.

i. If an emergency spillway is not provided, the system must pass the runoff from a 100-yr storm event.

j. Provide forebay construction details.

7. FEMA Flood Hazards:

a. Show the location of FEMA floodway, 100-yr flood fringe, cross-sections and flood elevations as determined by FIRM maps on the drawings.

b. Show the location of the flood fringe area based on the FEMA flood elevation and the actual site topography.

c. Show the minimum finish floor elevation for sites adjacent to a flood hazard (2’ above flood elevation).

d. Provide material specifications and compaction notes for fill to be placed in a floodplain. Certification of fill compaction is required for material placed in a floodplain.

e. Provide the note listing the datum used for the topo and flood elevations.

8. Easements:

a. Minimum of 20’ wide, pipe centered in easement preferably in common open space.

b. Width requirements based on pipe depth (see Appendix A) and must provide for 1:1 excavation, bottom width = outside pipe diameter + 2’.

c. Shall be dedicated to the City of Kannapolis.

d. Maximum slopes for maintenance vehicles: longitudinal = 15%, cross slopes of 5%.

e. Water mains that serve more than one structure shall be considered public and will be provided with an adequate easement to maintain the line. All multi-family developments shall be provided with a separate meter for each structure. Waterlines feeding these meters will be considered public.

f. See LDSM for overlapping easements.

9. Other:

a. Stream Buffers shall be clearly delineated or provide letter from a Qualified Individual stating that there are no streams on the site.

b. Erosion Control Permit:

i. If land disturbance > 1 ac provide copy of NCDEQ permit to City.

ii. If land disturbance < 1 ac obtain permit from City. Provide sufficient plan information (details/notes) to demonstrate intention to control erosion and prevent sedimentation from leaving the site.

c. Provide copies of all necessary environmental permits.

d. Encroachments will be needed for work in public rights-of-way and easements.

e. Provide copies of land owner agreements for any offsite grading.

f. Provide an AutoCAD file for AutoTurn and review of the site design.

END OF SECTION

B. INFRASTRUCTURE PLAN REVIEW CHECKLIST

THE FOLLOWING INFORMATION IS REQUIRED FOR ALL CONSTRUCTION DRAWINGS

1 paper & 1 digital copy of plans and calculations. Provide Autocad file upon plan approval.

☐ **Initial Review Submittal** ☐ **Revised Review Submittal** ☐ **Final Approval Submittal**

☐ Construction plans: submitted on 24” x 36” sheets and include: an overall sheet for each section; sheet and page numbers; a legend showing line types and symbols; locations of all benchmarks and datums; appropriate sheet match lines; all referenced details; cross sections and pavement designs; separate sheets showing all easements, common spaces, and greenways; a separate storm drainage structure & pipe schedule,

☐ Utility plans: all water, sewer, stormwater, and roadways shall be shown in plan and profile at a preferred scale of 1” = 20’ horizontal with appropriate vertical scale; where feasible water and sewer is stationed along sanitary sewer, otherwise provide separate plan/profile, and stationing; label length of water mains and storm drainage pipes, label length and bearing of all sanitary sewer pipe; stormwater is referenced in the plan and profile with structures labeled; all utility clearances are labeled.

☐ RPZ's are to be located outdoors within 5' of the meter unless otherwise approved in advance in writing by the City's Director of Water Resources.

END OF SECTION

C. PUBLIC WATER AND SEWER MAIN EXTENSION REQUIREMENTS

All Water and Sewer Extensions to the City of Kannapolis systems shall be permitted through the North Carolina Department of Environmental Quality (NCDEQ) and shall be in accordance with The Standard Specifications for Wastewater Collection and Water Distribution for the Water and Sewer Authority of Cabarrus County (WSACC) and The City of Kannapolis Water & Sewer Standards and Policies.

a. The below list should be considered as a guideline and should not be considered as a comprehensive list for all requirements of plan submittal.

   i. NCDEQ & City forms to be completed after initial City Review.

   ii. Permitted through NCDEQ (City to review prior to NCDEQ Submittal).

   iii. Electronic Copy of plans will be required for WSACC flow acceptance.

   iv. Design per City of Kannapolis Land Development Standards Manual and WSACC Standards–Standard Details can be obtained at www.wsacc.org and www.kannapolisnc.gov.

   v. Water Meters, Fire Hydrants, and Backflow devices per City Standards.

   vi. All Fire Hydrants shall be public and connected to mains owned and operated by the City of Kannapolis.

   vii. All Irrigation Lines shall be metered separately.

   viii. All water mains that serve more than one structure shall be considered public and will be provided with an adequate easement to maintain the line. All multi-family developments shall be provided with a separate meter for each structure. Waterlines feeding these meters will be considered public.

   ix. All water & sewer mains shall be required within the pavement section of all roads, regardless of public or private maintenance of the roads.

2. Water models shall be required for permitting and to verify sufficient flows and pressures for the proposed extension.

   a. The following items shall be included as part of proposed water system model:

      i. Summary of the flow test data used to create model.

      ii. A schematic of the proposed system with all nodes and pipes clearly labeled.

      iii. Model should show that average daily use plus minimum fire flow requirements will not drop the pressure below 20 psi anywhere in the system.

iv. To simulate the existing system, the connection to the existing system should be modeled using a reservoir and pump. Pump curve should be based on fire hydrant flow data. Pump Report should be provided.

v. Pipe summary table should be provided that includes the following:

1. Pipe label, length and diameter.
2. “C” factor (maximum allowable “C” factor = 120).
3. Flow under average daily conditions.
4. Hydraulic grade (upstream and downstream).
5. Head loss per 1,000’ of pipe.

vi. Junction summary table should be provided that includes the following:

1. Junction label, elevation and demand under average daily conditions.
2. Static head and pressure.
3. Residual head and pressure under average daily conditions.

vii. Fire flow summary table should be provided that includes the following:

1. Junction label.
2. Available fire flow.
3. Available total flow.
4. Residual pressure at the fire flow node.
5. Minimum system pressure junction.
6. Minimum system pressure.

END OF SECTION

D. PLAN NOTES

Site Plan Sheet Notes:

1. The City of Kannapolis Land Development Standards Manual and NCDOT Standard Specifications are used for construction of the roadways, including the NCDOT SuperPave Manual.

2. Section 1018 of the NCDOT Standard Specifications will be used for the acceptance of borrow material being used for embankments backfill or other intended uses.

3. A 48-hr notice for scheduling is required for the proof roll. Please allow adequate time for the inspector to perform grade checks on the subgrade and ABC.

   a. A proof roll will be performed prior to:

i. Placement of curb and gutter.

ii. Placement of ABC.

iii. Placement of asphalt.

4. Aggregate Base Course shall be provided from approved sources as outlined in Section 1010 of the NCDOT Standard Specifications.

5. A Pre-Paving meeting will be required prior to any paving.

6. A NCDOT approved Job Mix Formula must be submitted for approval prior to paving.

7. Asphalt mixes and depths will adhere to the typical section for roadways approved in the construction drawings. Minimum depths unless otherwise noted will be 2 ½" of I 19.0C placed in one lift and 2" of S9.5C placed in two lifts. The first lift of S9.5C will be placed immediately on the I19.0C, and the second lift will be placed prior to acceptance of the road. Drainage will be required on the roadway during the transition of the two lifts of S9.5C.

8. A Pre-Pour meeting will be required prior to any concrete pours.

9. A NCDOT approved Mix Design must be submitted on a NCDOT form 312U prior to placing any concrete.

10. Refer to detail sheets for the proper installation requirements for storm piping using NCDOT Standard Drawing 300.01.

11. The contractor shall be required to submit a video of the storm system prior to acceptance of the system. In new subdivisions, 2 videos of the storm system shall be required. The first video is required to be performed prior to the first proof roll. The second video is required after the installation of dry utilities, but prior to acceptance of the streets by the City of Kannapolis.

12. Erosion Control Permit is required on-site during construction. NCDEQ will be inspecting the project for compliance with the erosion control plan if disturbing more than 1 ac City of Kannapolis Erosion Control Permit required for all construction disturbing less than 1 ac City will be inspecting the project for compliance with the erosion control plan.

13. The approved typical section includes a shoulder behind the curb and gutter on both sides of the roadway. The shoulder must be preserved during grading of adjacent properties.

14. Only street legal vehicles, legally loaded appropriately for the hauling vehicle, shall be used to transport construction materials on City streets.

15. Notify the City of any work being performed on the weekends. No work requiring testing or observation by the City will be permitted without written permission.

16. Noise Ordinance: 7:00am to 9:00pm – weekdays, 8:00am to 9:00pm weekends.

Utility Plan Sheet Notes:

1. All water main and sanitary sewer work shall be in accordance with the City of Kannapolis Land Development Standards Manual and standard specifications for wastewater collection and distribution for the Water and Sewer Authority of Cabarrus County (WSACC). Contractor shall have a copy of these specifications on-site at all times.

2. All existing water and sewer mains are owned and operated by the City of Kannapolis. The site inspector must be contacted at least 48 hrs prior to making any connection to the existing system.

3. Sanitary sewer laterals and water meter locations are approximate and are subject to relocation due to field locations. Under no circumstance will cleanouts and meters be located in driveways, sidewalks or under pavement of any type.

4. Water meters shall meet City of Kannapolis standards. Contractor is responsible for installing meter boxes and purchasing meters. Contractor shall coordinate with site inspector to have water meters delivered to the City of Kannapolis.

5. The developer will be responsible for paying applicable water and sewer connection fees before Zoning Clearance Permits are issued.

6. Contractor is fully responsible for contacting all appropriate parties assuring that utilities are located prior to commencement of construction. Call North Carolina 811 (1-800-632-4949) for utility locating services as required by law prior to commencement of any work. Contractor shall verify location and depth of all utilities prior to construction.

7. Contractor shall be responsible for sewer overflows that occur due to activities initiated by them and shall be responsible for, but not limited to, the costs associated with performing remedial work of/for environmental impacts and/or the paying of fines assessed by regulatory agencies and/or third-party claims.

8. Water & Sewer mains shall have a minimum cover of 36”.

9. Bedding for PVC sewer mains and laterals should be WSACC Class B Bedding.

10. Unless otherwise noted, waterlines shall be PVC C900 for 6” - 12” diameter and PVC SDR 13.5 for 2” - 4” diameter per WSACC standards.

11. Unless otherwise noted, Sewer mains shall be PVC SDR 35 per WSACC standards.

12. Laterals shall have a No-Hub cap and stainless-steel No-Hub band at the clean out.

13. Ductile iron pipe shall be required for both water and sanitary sewer if the following clearances are not met:

    a. Waterline crossing under sanitary sewer (for any clearance).

    b. 18” vertical clearance for waterline installed above sewer line.
    c. 10’ horizontal separation for waterline parallel to sewer line (or 18” vertical separation in separate ditches).

    d. For waterline, 18” clearance with storm drains.

    e. For waterline, 12” clearance with gas mains, telephone ducts and underground cables.

    f. For sanitary sewer, 18” clearance with storm drains.

    g. Regardless of pipe material, a minimum 12” separation shall be required for water and sewer between other piping.

14. Initial connection to the existing water main shall be in accordance with the City of Kannapolis detail for a temporary by-pass connection for filling new water mains. The temporary jumper connection shall be removed and the waterline connected to the existing system only after the proposed

system has been pressure tested, chlorinated and accepted by the City of Kannapolis. No other connections will be allowed to the system until the proposed system has been accepted.

15. Notify the city of any work being performed on the weekends. No work requiring testing or observation by the city will be permitted without written permission.

16. Noise Ordinance: 7:00am to 9:00pm – Weekdays, 8:00am to 9:00pm Weekends.

END OF SECTION

E. ENCROACHMENT AGREEMENTS

1. Encroachment of any structures or landscaping, including, but not limited to, driveways, pools, fences, trees, wells, reservoirs, or other obstructions, which would interfere with free, easy, and clear access to utilities on any easement, are prohibited. However, certain structures, filling, or grading may be permitted upon execution of an express Encroachment Agreement. The City of Kannapolis may authorize an Encroachment Agreement, but only after review and approval of detailed plans.

2. In the event the City authorizes an Encroachment Agreement, obtaining the encroachment shall require the following:

    a. A list of appurtenances being requested to encroach into the easement.

    b. Provide a map of the encroachments with:

        i. Site plan/map showing location of easements with the encroaching items (buildings, parking, utilities, etc.).

        ii. Plat or deed book and page number that has the property and/or easement.

3. The Director of Engineering may impose additional and reasonable conditions upon the granting of any encroachment.

4. For Right-of-Way Extension/Service Permit, see Appendix A.

END OF SECTION

F. AS-BUILT REQUIREMENTS

Prior to Final Acceptance of the improvements, the Project Engineer shall submit to the Director of Engineering 1 certified copy of the “As-Built Record Drawings”, 1 digital pdf file, and 1 AutoCad file. “As Built Drawings” shall be tied to NAD 83 horizontal datum and to the NAVD 88 vertical datum. The Project Engineer shall provide all certifications that are required by the state for water and sewer improvements.

As-Built Drawings shall include the following:

1. **Site Impervious Area**

    a. Verify and label the total impervious area of the site.

2. **Sanitary Sewer**

    a. Elevations: Rim, Invert In (including inside drop), Invert Out.

b. Linear Footage and type of pipe installed.

c. Changes need to be reflected in plan and profile sheets.

d. Permanent Easements shown (if applicable).

e. Lateral Cleanouts shown in plan view.

3. **Water**

a. Valve and Fitting locations.

b. Fire Hydrant locations.

c. Verify minimum cover over pipe in profile view.

d. Verify type of pipe installed.

e. Show restrained joint pipe (if applicable).

f. Distances need to be shown in linear footage in plan view.

g. Meters shown in plan view.

4. **Storm Drainage Conveyance Systems**

a. Invert elevations (invert in and out).

b. Rim elevations (junction boxes).

c. Grate elevations (gutter line).

d. Invert elevations on culverts (box and pipe).

e. Flared End Sections elevation.

f. Rip rap energy dissipation apron dimensions

g. Linear footage of piping and type of pipe installed.

h. Topographic survey of ditches.

i. All dimensions shall be shown in plan and profile views.

j. Update the pipe schedule.

k. Revised calculations of as-built storm drainage conveyance systems with a statement from the Engineer of either in compliance or not in compliance with the approved design.

l. Storm Drainage Conveyance System Certification.

5. **Stormwater Control Measures (SCM's)**

a. Trash rack info.

b. Method used to seal joints in pipes and wall openings.

c. Type of sand (sand filters).

d. Biomix material composition and infiltration rate (Bioretention).

e. Channel Liner materials.

f. Riser dimensions and elevations.

g. Anti-floatation block dimensions.

h. Stage storage chart for storage basins, forebays, detention areas, chambers, etc.

i. Calculations verifying that the as-built design complies with design guidelines for the SCM and that the system provides the required detention storage and reduced runoff discharge rates.

j. As-built topo verifying:

   i. Location and Storage capacity of SCM.

   ii. Access easement locations and grades.

   iii. Basin side slopes (interior and exterior), top of embankment widths.

   iv. Riser/Spillway elevations and widths.

   v. Location of drainage features.

   vi. Location/outline of underground filter systems.

   vii. Pipe inverts, pipe size, and pipe materials.

   viii. Underdrain inverts, cleanout inverts, underdrain pipe size and materials.

   ix. Thickness of energy dissipation aprons and filters.

   x. Filter fabric materials used.

   xi. Orifice/weir inverts and dimensions.

   xii. Bottom drain gate size/type and critical elevations (invert and top of valve stem).

k. Planted Material Certifications.

l. Any data needed to document the compliance with the NCDEQ Minimum Design Criteria for the SCM.

m. Revised calculations of as-built facilities.

n. SCM Certification.

6. **Streets**

   a. Road profile.

b. Radius points.

c. Curb elevations.

END OF SECTION

G. Certifications

Certification forms for Stormwater As-Builts, Retaining Walls, Bridges, and Stormwater Control Measures can be found in Appendix A.

END OF SECTION